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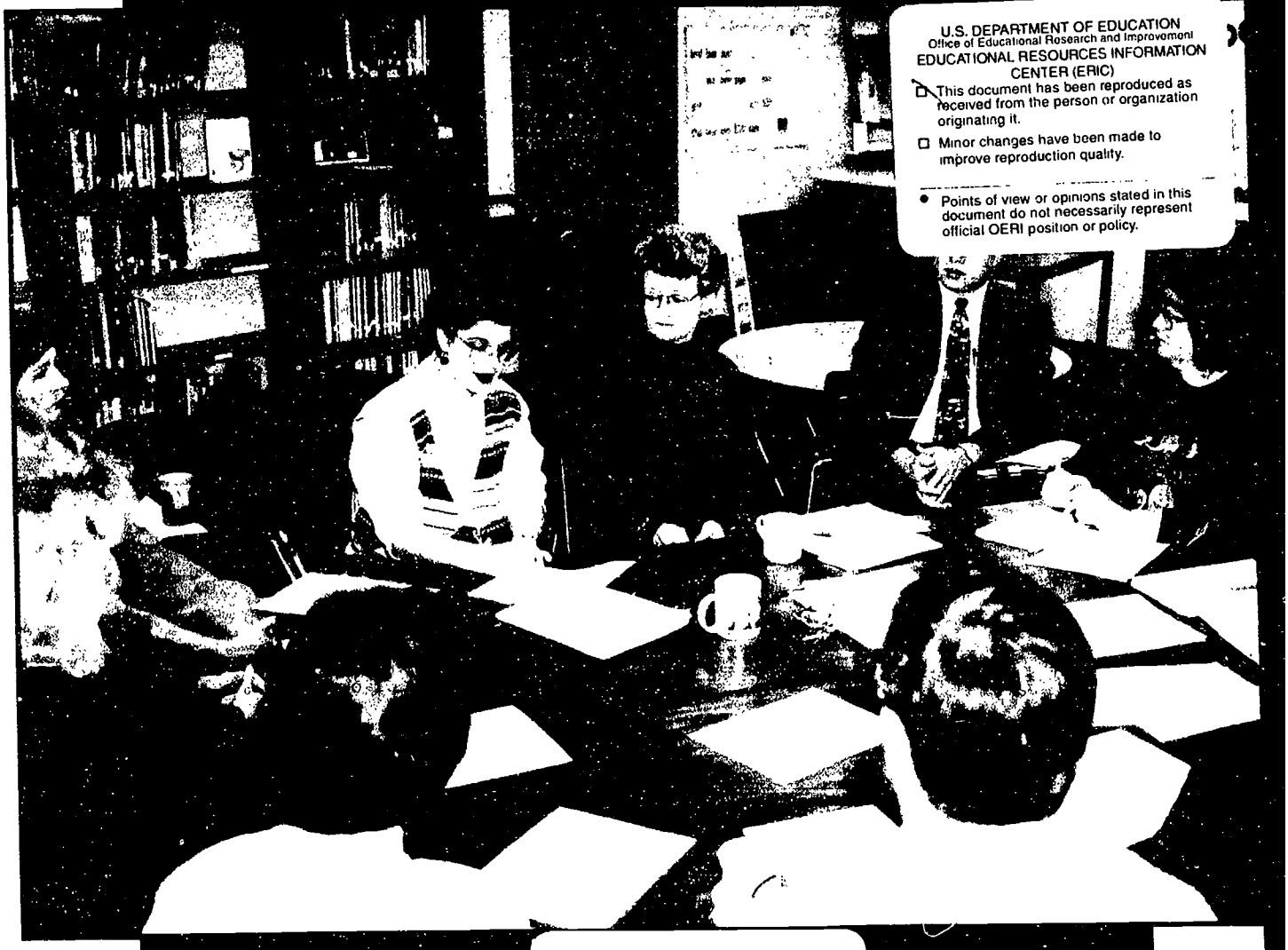
ABSTRACT

This study evaluated the cost effectiveness of Instructional Support Teams (IST) in Pennsylvania, by comparing IST costs to those of traditional special education programs. An introduction notes pressures for change and the objectives of the prereferral intervention utilized in the IST approach. The study compared costs and program effectiveness of 1,074 schools in various phases of the IST process with those of a subset of the schools prior to IST implementation. Program effectiveness measures included the number of referrals to IST, the number of referrals for special education evaluation, number of special education placements, and number of same-year retentions. Cost measures included estimates of staff involvement, average salary and benefit costs, estimates of current and long-term costs, and extra costs of retentions. The study found that the IST had approximately equal costs to the traditional program. However, fewer students were placed in special education with the IST approach, and many more students with learning and behavioral problems were provided services than through the traditional program, indicating substantially higher effectiveness for the IST program than the traditional program. (Contains 15 references.) (DB)

Cost-Effectiveness of Instructional Support Teams in Pennsylvania



William T. Hartman
Todd A. Fay

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The Center for Special Education Finance (CSEF) was established in October 1992 to address a comprehensive set of fiscal issues related to the delivery and support of special education services to children throughout the U.S. The Center's mission is to provide information needed by policymakers to make informed decisions regarding the provision of services to children with disabilities, and to provide opportunities for information sharing regarding critical fiscal policy issues.

For Information

Center for Special Education Finance (CSEF)
American Institutes for Research
1791 Arastradero Road
P.O. Box 1113
Palo Alto, CA 94302
Phone: 415/493-3550
Fax: 415/858-0958
e-mail: CSEF@AIR-CA.ORG

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I. Introduction

Pressures for Change

Traditional special education practices are being challenged on educational and economic grounds. The programmatic challenge is exemplified by two recent statements.

> Opinions about research and identification practices; about the effects of labeling; about teachers' attitudes, skills, and priorities; and about the effects of the excellence in education movement have stimulated some professionals to seriously question the appropriateness of classifying and placing students in special education classrooms (Ysseldyke, Algozzine, & Thurlow, 1992, p. 125).

> It is time to do away with the 'refer, classify and place' mentality that has captured thinking for the past 100 years (Algozzine, 1993).

The fiscal challenge comes from the costs involved in providing special education services to a steadily increasing number of students. The 1993-94 federal special education child count recorded over 5.4 million children, a 3.7 percent increase in one year. This represents the largest enrollment jump since reporting began in 1976-77 (U. S. Department of Education, 1994). Special education remains an expensive program for states and school districts, consistently being approximately two times the costs of regular education (Chaikind, Danielson, & Brauen, 1993). Further, a recent study claims that much of the increase in educational spending since 1967 has been due to special education (Rothstein & Miles, 1995).

An important response to both the programmatic and fiscal concerns are the prereferral intervention approaches which have become widespread. Carter and Sugai reported that 34 states required or recommended some form of prereferral

intervention (Carter & Sugai, 1989). One such prereferral system, Pennsylvania's Instructional Support Team (IST) process, has had widespread implementation since its initiation in 1990-91 and is now in operation in all school districts in the state (Kovaleski, Tucker, & Duffy, 1995). The IST is a collaborative model that emphasizes assistance to students in their regular classes and home schools.

This study examines the cost-effectiveness of Instructional Support Teams in Pennsylvania. If, through support to students and their regular classroom teachers, more students can be kept in their regular classrooms instead of being shifted into separate, more costly special education programs, then instructional improvement will coincide with cost reduction. Further, since at least one elementary school in each of Pennsylvania's 501 school districts is using the IST process, this initiative represents a comprehensive statewide implementation with results that have significant implications for education policymakers at the state and national levels.

Traditional Special Education Process

While many statutes and regulations govern its operation, the traditional special education process consists of only three principal steps: referral, evaluation, and placement into special education programs. Students who are having difficulty in the regular classroom are referred, generally by their classroom teacher, for an assessment of their learning problems. The assessment includes a multidisciplinary evaluation (MDE) to resolve two issues: (1) if the student meets state eligibility criteria for special education, and (2) if the student demonstrates a need for specialized instruction. Students who meet both criteria are placed in special education programs, and Individualized Education Programs (IEPs) are developed to guide the provision of special education services. Students who do not meet the criteria remain in the regular classroom without additional instructional assistance.

Prereferral Intervention

Prereferral intervention approaches seek to meet the dual challenges facing special education. They are designed to provide a more appropriate educational program for students at a lower cost. Prereferral intervention is defined as a regular class teacher's adjustment or modification of instruction or behavior management before making a request for a formal evaluation. It is preventative in nature and designed to (1) provide early and systematic assistance to students in their regular classroom environment, (2) reduce or eliminate inappropriate referrals for testing, (3) reduce unnecessary placements into special education, and (4) increase the

regular classroom teacher's capacity to deal with the more difficult-to-teach children.

The IST Approach[1]

In Pennsylvania, during the 1988-89 school year, a combination of an inadequate system of funding special education and the continued escalation in the number of children being identified as mildly handicapped and placed into special education programs caused a shortfall of more than $100 million in funding for special education (Hartman, 1993). The state legislature agreed to cover the deficit for that year under conditions that forced the state board of education to change the special education program delivery system. The new Standards and Regulations for special education included the Instructional Support Team (IST) initiative,[2] a prereferral system conceived to prevent placement in separate special education classes for students who can be served more appropriately through modifications in regular education.

Instructional Support Teams are designed to intervene early with students who are experiencing learning or behavior problems; the goal is to meet students' instructional needs within the setting of their regular classrooms. The process also provides districts with a comprehensive screening system for students who may be in need of special education. IST uses specific assessment and intervention techniques to help remove educational, behavioral, or affective stumbling blocks for students having difficulty in the regular classroom.

Members of the Instructional Support Team differ among schools, but always include the building principal, a support teacher/consultant, and the teacher who referred the student. The building principal, as instructional leader, is responsible for the supervision and implementation of services recommended by the IST. Other members who may be part of the team include the school psychologist, guidance counselor, remedial teachers, and any other teachers as appropriate.

[1] The Instructional Support Team Project is an initiative sponsored by the Pennsylvania Department of Education. Project staff provide training, technical assistance, and program evaluation for school districts implementing the IST program. They also collect and maintain data concerning the initiative. This section is based upon documents produced by the IST project: J.F. Kovaleski, 1993; J.F. Kovaleski, 1994; and Kovaleski, Tucker, & Duffy, 1995.

[2] Pennsylvania State Board of Education Regulations, Chapter §14 and Pennsylvania Department of Education Standards, Chapter §342.

The support teacher works under the direction of the building principal. Primary duties are to:

- facilitate screening of students suspected of being eligible for special education services
- provide consultation, technical assistance, and training to the teachers and parents of identified students
- provide direct instructional services to identified students in regular education environments for the purpose of determining the student's instructional level[3]

The entire IST receives extensive training provided by the Pennsylvania Department of Education. Fundamental elements of the training model include highly specific hands-on training at the building level in the following areas: consultation/collaboration, instructional assessment, behavior management, curriculum adaptation, and student assistance. The general aim of the training is the development of effective techniques within the designated building that will improve the regular teachers' abilities to meet the needs of students who are experiencing difficulty in their classrooms. Over time the role of the support teacher may change or diminish as the regular classroom teachers use the strategies they learned as part of Instructional Support training with other children experiencing similar difficulties in their classrooms.

The IST process is a 60-school day procedure, containing four interrelated phases: Entry, Hypothesis Forming, Verifying, and Outcome. A request for assistance from a classroom teacher or parent initiates the Entry phase, which includes collection of information, a curriculum-based assessment of the student's difficulties, initial contact with the referring teacher, and notification and invitation to parents to participate in the process. Parent, teacher, and student interviews; reviews of records; and observations are some of the strategies used to facilitate data collection. The Entry phase must be completed within 10 school days.

During the Hypothesis Forming phase, the initial data collected are analyzed and extended through in-depth, ongoing assessment in areas of concern. Academic, behavioral, social, developmental, cultural, and life-skills areas are addressed in an effort to develop a complete picture of the student's strengths and weaknesses. This assessment then leads to a more precise identification of the student's

[3] Pennsylvania Department of Education Standards, Chapter §342.24.

problem(s) and the systematic search for instructional strategies within the regular classroom that will lead to student success. The Hypothesis Forming phase is completed within the next 10 school days.

The Verifying phase begins with the setting of specific, outcome-based goals, followed by development and implementation of an action plan to deliver specified instructional interventions. During this time, the support teacher provides assistance to the regular classroom teacher, who is primarily responsible for carrying out the instructional program. Ongoing monitoring of the success of interventions is an important element during this 30 school-day phase.

During the final 10 days of the process, the Outcome phase, the Instructional Support Team's charge is to determine whether the interventions have been successful and whether they have been and/or can continue to be sustained by the regular classroom teacher without the assistance of the support teacher. This is accomplished by reviewing the monitoring data on the student, establishing rates of acquisition and retention, and determining degree of need.[4] If the IST strategies prove to be unsuccessful or cannot be sustained in the regular class, referral for multidisciplinary evaluation (MDE) must then occur.

Cost-Effectiveness of the IST Process

The basic purpose of cost-effectiveness analysis in education is to compare two (or more) programs that have the same or similar objectives. One program is more cost-effective than another if it either (1) achieves greater results for the same (or less) cost, or (2) achieves equivalent (or better) results for less cost. The requirements for a cost-effectiveness analysis are reliable program cost data and a common measure of effectiveness for each program.

The IST process mandates substantial prereferral activity to assist students in the regular classroom. In effect, this is a front-end investment designed to improve instructional services to students having learning problems and to reduce long-term costs in special education. If it is successful, most students referred to IST will be served appropriately through modifications in the regular instructional program, fewer students will be referred for a multidisciplinary evaluation, and relatively fewer students will be placed in special education programs.

[4] These terms were developed and defined by the IST Project. Rate of acquisition: the rate at which a student successfully learns (masters) new material; rate of retention: the percentage of material learned previously that is retained and recalled on subsequent learning occasions; degree of need: the student's measured instructional level compared to the functional ability of the regular education program to maintain that level in the student's regular class.

The IST approach within a school also has a potential impact on retention of students. Retention occurs when a student does not make sufficient progress in a given grade and is retained in that same grade for another year. This practice has little support in the literature in terms of a practice that benefits children, their teachers, schools, and school districts, or the state. It is also a costly practice. "Retention of pupils results in a need for additional teachers, facilities, and materials at a rate approximating the rate of retention, i.e., a seven percent retention rate increases expenditures by approximately seven percent" (Balow & Schwager, 1990, p. 1).

Through IST training and assistance, regular teachers gain increased skills and a wider range of instructional techniques which can be used to assist all students in their classrooms. With these new skills, it is likely that some marginal students, in danger of failing under a traditional approach, can be better instructed by regular teachers using IST approaches. If this is the case, retentions should decline in schools implementing IST.

II. Methodology

As suggested earlier, a cost-effectiveness analysis requires a comparison of the costs and effectiveness of two or more alternatives (Levin, 1983). The two alternatives this study examined were the IST approach and the traditional special education approach. To be effective, the educational programs provided to students as the result of an IST intervention should meet their needs at least as well as the traditional system. There was a presumption in this study that students who were able to remain in regular education and learn appropriately were better served than if they had to be removed to a separate special education setting for part or all of their educational program. The regular class, when it is the least restrictive environment, is the preferred choice of special educators, as well as the law (Individual with Disabilities Education Act, P.L. 94-142). To be cost-effective, the costs of the IST approach should be no greater than the costs of the traditional program. However all relevant costs must be considered, including prereferral, referral, and placement, which may have multiyear costs.

Data Years

Reliable data about the IST operation in Pennsylvania were not available for 1990-91 and 1991-92, the first two years of implementation. Adequate records were not kept to determine the number of students involved with IST and what steps they reached in the process. Consequently, this study used data for the 1992-93 and 1993-94 school years.

Schools

■ IST schools

To analyze the effects of IST on students, the group of elementary schools that had implemented the program were used to determine both the costs and effectiveness

of the new approach. The first year of implementation of IST was 1990-91. In that year, 196 schools began using the IST approach; they are known as Phase I schools. These schools have continued the IST program, and by the 1993-94 school year were in their fourth year of operation. The annual phase-in continued through 1994-95, adding another phase of schools each year.

Year	Phase	Schools	Cumulative
1990-91	I	196	
1991-92	II	227	423
1992-93	III	271	694
1993-94	IV	380	1,074
1994-95	V	327	1,401

The study examined the prereferral experiences of 1,074 schools in IST Phases I through IV for the two school years 1992-93 and 1993-94. Phase V schools were not included in the IST group because they only began IST implementation in 1994-95.

■ Traditional program

To compare the costs and effectiveness of the traditional program, data from Phase IV and Phase V schools in the year(s) prior to their implementation of IST were utilized. For Phase IV schools, data from 1992-93 were used; and for Phase V schools, data from 1992-93 and 1993-94 were used. As a condition of their participation in the IST program, these schools submitted comparable student data on their special education referrals, evaluations, placements, and retentions for the years before they began IST. A broader sample of elementary schools with a traditional approach was not feasible because comparable data were not routinely collected by the state.

Program Effectiveness Measures

The specific effectiveness measures were collected from the Instructional Support Team Project data files (Kovaleski, McKinley, & McClosky, 1995). They included (1) the number of referrals to IST, (2) the number of referrals for psychological evaluations to determine special education eligibility, (3) the number of students placed into special education programs, and (4) the number of same-year retentions reported by the schools. To compare the effectiveness of each approach, the average values of the measures from the IST schools and from the traditional schools were applied to a hypothetical elementary school of 500 students; and the outcomes, in terms of number of students at each step of the process, were calculated.

Cost Measures

The cost measures were developed for each step in the IST and the traditional approach by determining the quantity of resources needed to accomplish that step. For these processes, the primary resources were time of various personnel to carry out the required activities of each step. Once the type and quantity of personnel resources were determined, prices were attached to each resource and the costs were calculated. Other nonpersonnel costs, such as supplies or travel, were estimated by participants to be minor and were therefore not included.

■ Staff involvement survey

As a preliminary step, staff who participated in both the IST program and the MDE process were asked to estimate the staffing resources required for these activities. The time involvement for each staff member in the IST process was derived from a survey of 73 support teachers who were directly involved with the training and implementation of IST in their local schools on a daily basis. Their responses were used to identify personnel who participated in the process and to calculate an average amount of time involved for each person connected with the IST. The same procedure was used to determine the type of staff involved and the amount of time for each staff member in the MDE process. Staffing data were obtained from a survey of 88 school psychologists, the primary staff members involved with a multidisciplinary evaluation; and their responses were averaged.

■ Standardized costs

Standardized or average prices were established for each resource. In this way, the wide variation in personnel salaries across the state did not impact upon the school comparisons. For personnel, state average salaries for 1993-94 by type of position (i.e., principal, classroom teacher, school psychologist, support teacher, guidance counselor) were used. Benefit costs were estimated at 30 percent of salary amounts. The average hourly costs by staff member were estimated by dividing the total amounts for salary and benefits by the total number of hours worked during the year. These average personnel costs by position were multiplied by the time for each staff member involved to yield a cost per position for both the IST and MDE processes.

The only exception to determining costs based on hours spent per IST or MDE student was for the support teacher. This position was a new one and was assigned to an elementary school for the purpose of assisting with the implementation of

the IST process. As a result, the entire cost of this position (i.e., average annual salary and benefit amount) was considered a cost of the IST program.

Current and long-term costs

An important purpose of the IST process is to reduce the number of students inappropriately referred to and placed in special education programs. Since placements of students into special education programs have multiple year cost consequences, two types of costs were considered in comparing the alternatives: current year costs and long-term costs.

Current costs were the costs of operating the referral, evaluation, and placement processes for each alternative for the year, along with the costs of retention. Support teacher costs were not included after the first year since the analysis follows the effects on a single cohort of students who received IST intervention in a given year through a 10-year period; in subsequent years they would not receive IST services. Support teacher costs in later years would be assigned to later annual cohorts. If any students in the initial cohort were referred to IST in subsequent years, they would be part of that later year cohort for purposes of cost analysis, and in subsequent years the support teacher costs would be assigned to later cohorts.

Long-term costs were the future costs of maintaining students in more expensive special education programs over the course of their school career. The students for whom the IST interventions are most likely to be effective would be those with mild disabilities, who typically would be served in resource or part-time, self-contained programs. The annual costs of these traditional special education programs designed to serve these students are generally twice those of regular education (Moore et al., 1988).[5] They tend to be multiyear costs, since most children placed in special education programs are identified in the elementary grades and stay in special education until they graduate from high school (Will, 1986).

In this study, twice the cost of regular education was used to estimate the average annual cost of special education placement. Consequently the additional or excess cost of special education per student was estimated to equal the average cost of regular education per student. These costs continued for each year that a child was assumed to remain in special education. Costs for future year placement were discounted back to present values using 0, 5, and 10 percent rates to test the

[5] Table 4.3 in Moore et al. gives ratios of special education costs to regular education costs of 1.9 for resource programs and 2.5 for self-contained programs.

sensitivity of the results to the choice of discount rate. An assumption of 10 years in special education was used to reflect initial placement in early grades; this assumption was also examined through a sensitivity analysis.

■ Retentions

When a student is retained for an extra year in the same grade, the length of time required to complete 12 grades of schooling is increased by a year. The cost implication of this practice is to add the equivalent of an additional cost per student to the costs of the schooling. Therefore, in the cost analysis, any reductions in retentions in IST schools were treated as cost savings at the rate of the average cost of regular education per student.

III. Comparison of Rates of Referrals, Retentions, and Special Education Placements

The programmatic results of the IST schools appear in Table 1, along with the companion results of the traditional schools. The table presents data for each of three effectiveness areas: IST referrals, MDE referrals, and special education placements. For IST schools, the results by year of operation are given to show any effects over time, along with the average for all schools. Traditional school results were for the two years covered by the study and their average.

Referrals to IST

Referrals to the IST program were lower in the first year of operation but grew in later years, and in the fourth year of operation (Phase I schools only) showed another increase in rate. The results indicate that IST was increasingly used by classroom teachers, presumably as they became familiar with the process. Many more students received additional instructional assistance in IST schools; over 8 percent of students in most IST schools were assisted through the IST process. By comparison, only 3 percent of students in traditional schools were referred for a multidisciplinary evaluation, an action triggered by the inability of the program in the regular classroom to meet a student's instructional needs. It was apparent that the IST reached a much broader range of students with learning and behavioral problems, and was even more of a regular education program than a special education program. Importantly for cost considerations, IST is a prereferral program and students received assistance before they were even considered for more costly services, including MDE and special education placements.

Table 1
IST and Traditional School Results

	IST Schools Years of IST Program Operation					Traditional Schools Year of Operation		
	1st Year	2nd Year	3rd Year	4th Year	Average	1992-93	1993-94	Average[b]
Student Flows (% of Total School Population)								
Referrals to IST	5.85%	8.18%	8.26%	9.66%	7.75%			
Referrals to MDE								
From IST	0.83%	1.24%	1.33%	1.61%	1.20%			2.11%[c]
Direct without IST	1.18%	0.85%	0.70%	0.67%	0.88%			0.88%[d]
Total	2.01%	2.09%	2.03%	2.28%	2.08%	2.96%	3.04%	2.99%
Placements in Special Education								
From IST	0.44%	0.71%	0.72%	0.81%	0.65%			0.79%[c]
Direct without IST	1.05%	0.79%	0.75%	0.94%	0.87%			0.87%[d]
Total	1.49%	1.50%	1.47%	1.75%	1.52%	1.68%	1.61%	1.66%
% of Referrals to IST								
IST Success Rate[a]	85.8%	84.9%	83.9%	83.3%	84.6%			
IST Referrals to MDE	14.2%	15.1%	16.1%	16.7%	15.4%			
Total	100.0%	100.0%	100.0%	100.0%	100.0%			
% of MDE Referrals Placed in Special Education								
From IST	52.6%	57.9%	54.4%	50.1%	54.2%			37.2%[c]
Direct without IST	88.8%	96.0%	107.6%	138.8%	103.4%			103.4%[d]
Total	73.9%	72.8%	72.8%	76.3%	73.6%	56.9%	53.0%	55.6%

a/ IST Success Rate equals the percentage of students referred to IST who are maintained successfully in the regular classroom.
b/ Total values were taken from project records; they were separated into:
1) Students likely to have been referred to IST
2) Students likely to have been referred directly to MDE and placed into special education
c/ Assumed equal to IST schools
d/ Calculated as Total minus Direct

Operation of IST

The success rate of the IST was defined as the proportion of students referred to IST who remained in the regular classroom without need for evaluation and special education services. It was very high and consistent across all phases of schools and years of operation. Five out of six students referred to IST for learning difficulties were served successfully in the regular classroom. With this level of achievement, the IST schools were able to reduce the referrals to multidisciplinary evaluation for special education eligibility. Only about 15 percent of the students who participated in the IST program were referred further for MDE.

Referrals to MDE

■ IST schools

In IST schools, referrals to MDE came from two general sources: through IST and through direct referrals from parents and others. The combined referral rate averaged approximately 2 percent over all phases. As a percentage of the total school population, the referrals to MDE from the IST process grew over time; however, this reflected the growing referral rate to IST and the consistent success rate of students maintained in regular classrooms. The direct referrals to MDE, bypassing the IST process, declined over time, most likely reflecting greater experience with and confidence in the IST program.

■ Traditional schools

For traditional schools, referral of a student for a multidisciplinary evaluation by the classroom teacher was the first step in the special education process. In traditional schools, consistently 3 percent of the total student population were referred for MDE. These were substantially higher referral rates than those of schools using the IST process.

MDE to Special Education Placement

■ IST schools

Of those IST students who were referred to MDE, approximately half were placed in special education programs; but the other half were deemed not eligible for special education and remained in regular education. This finding, which was consistent over all years of operation, is a bit surprising given the function of IST. The strong success rate of IST indicated that 85 percent of students initially referred–presumably the students with less severe learning problems–received

adequate services in the regular classroom. This would logically leave only those students most in need of special education services to go on to MDE. However, the "batting average" for such students showed only a 54 percent placement rate, while the other 46 percent of students remained in regular education. This suggests that the accuracy of the MDE referrals was not very great, leaving those students who were ineligible for special education in their regular classrooms without additional assistance (even though they were previously unable to have their instructional needs met adequately, even with instructional adaptations developed through the IST process). These findings suggest that the MDE referral process is an area worthy of further investigation.

There was a very different pattern of special education placements for those students in IST schools who were referred directly to MDE and bypassed the IST process. Almost all of those students were placed in special education programs after a multidisciplinary evaluation. In fact, in a number of instances, over 100 percent of those with a MDE were placed in special education. This statistical aberration was most likely due to the effect of holdover students from the prior year (who were referred late one year and placed early the next year), and from transfer students (from other schools) who were also included in the school reports as placements, but did not have a MDE from the new school during the year.

The total percentage of students placed in special education from IST schools was a combination of the two different flows of students. Overall, approximately 74 percent of students who received a MDE were placed in special education.

Traditional schools

For traditional schools, only total data on the key measures were available. Consequently, it was first necessary to separate students in traditional schools who were similar to those who were referred to IST from those who likely would have bypassed the IST process and been referred directly to MDE. It was assumed that the same proportion of students from both types of schools would likely be placed in special education due to their more severe disabilities; these were the proportion of students from IST schools who bypassed the IST process, went directly to MDE, and were placed in special education. The remaining students referred to MDE from traditional schools were assumed to be similar to students from IST schools who had participated in the IST process. Table 1 shows these assumed subdivisions within referrals to MDE, percent MDE to special education, and placements in special education for traditional schools.

In comparison, the accuracy of the referral process for the traditional program was much worse than that of the IST program. Only 37 percent of those students most like those who went through IST were placed in special education programs after being referred to MDE. The remaining students, almost two-thirds of those who had been referred for evaluation of eligibility for special education, did not qualify and remained in the regular classroom without any further intervention or instructional assistance. Consequently, while the accuracy of the process of referral to MDE in IST schools could stand improvement, it already is an improvement over the traditional schools.

Placements

■ IST schools

The percentage of students placed in special education programs from IST schools was generally consistent over years of program operation. However, this was the result of two opposing trends: increasing placements from students involved in IST, and decreasing direct placements of students who bypassed IST.

■ Traditional schools

Average total placements in special education from traditional schools were slightly higher than those from IST schools (1.66 percent v. 1.52 percent). However, it is worth noting that the majority of students placed in special education in both types of schools were those who were likely to be more disabled and to move directly to special education. Consequently, the results were strongly influenced by referral and placement of students whom the IST process did not serve (or would have been unlikely to serve in traditional schools).

Retentions

Data on retentions appear in Table 2. Results were available for schools in all five phases for the two years prior to implementing IST and from one to four years with IST in operation. The IST appeared to have strong positive effects on reducing retentions. The retention patterns over time revealed a decline after schools began the IST process. Particularly for Phases I-III (i.e., those schools that began IST in the first three years), there was a drop in retentions in the first year of implementation, a drop in the second year, and a further drop in the third year, which subsequently appeared to stabilize. The Phase IV and V schools had declines in retentions in years before beginning IST. Anecdotal evidence suggests that the experiences of IST from schools in earlier phases, which were widely disseminated,

had a pre-effect on schools beginning the process later; that is, the IST effects on retention were felt even before implementation.

Summary

Overall, the results from IST schools showed consistent patterns, although there was some variation from year to year. While not uniformly true, the first year of operation appeared to be one of transition and learning, in that the results (e.g., referrals to IST, referrals to MDE, placements in special education) were typically lower than in following years. IST schools in later years of operation showed more stability and consistency in their results. Comparable measures from traditional schools were quite stable and very consistent over the two years of data collection.

Table 2
Retention in Same Grade as a Percentage of Total Enrollment

IST Schools Begin Year	Phase	2 Yrs. Prior %	1 Yr. Prior %	1st Yr. IST %	2nd Yr. IST %	3rd Yr. IST %	4th Yr. IST %
1990-91	I	1.76	1.64	1.59	1.04	0.83	0.89
1991-92	II	2.40	2.05	1.50	1.18	0.97	
1992-93	III	1.99	1.86	1.42	1.05		
1993-94	IV	1.83	1.23	0.99			
1994-95	V	1.11	1.03				
Average	All Phases	1.82	1.56	1.38	1.09	0.90	0.89
Average	Phases I-III	2.05	1.85	1.50	1.09	0.90	0.89

AVERAGE RETENTION	Pre-IST %	IST %
All Phases	1.69	1.06
Phases I-III	1.95	0.96

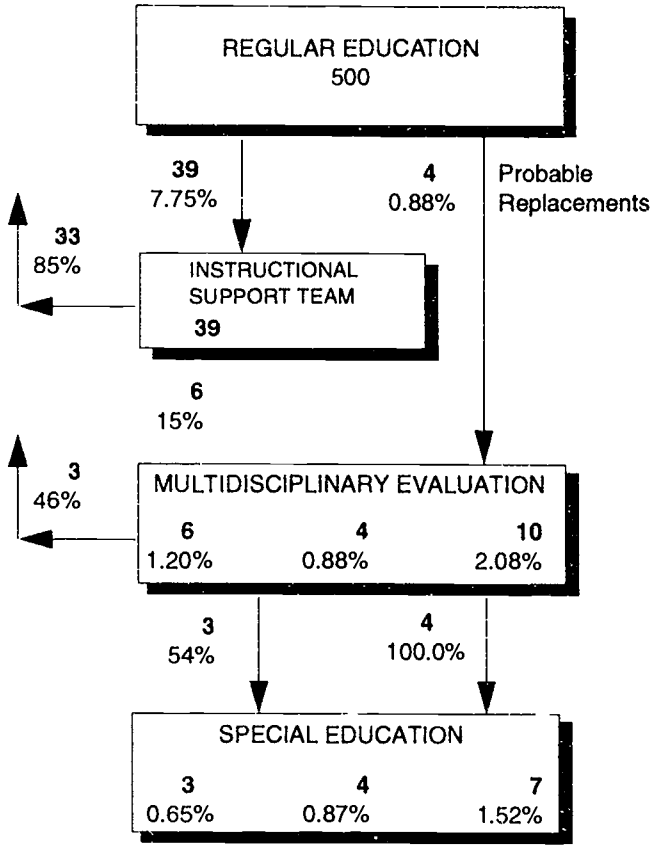
IV. Referral Rates and Special Education Placements in IST and Traditional Schools

To compare the effectiveness of IST and traditional schools, flowcharts were prepared, which traced the involvement of students through the steps leading to special education in both types of schools. The results for the IST schools appear in Figure 1 and for traditional schools, in Figure 2. These analyses used a hypothetical elementary school of 500 students and the average referral and placement rates presented in the previous section to calculate student flow through the schools.

IST Schools

The flow of students in an IST school divides into two paths: students referred to IST and students referred directly to MDE (probable placements). Using the average referral rate to IST, 39 of the 500 students in the school would be referred to the IST process. Of those, 33 students (85 percent) would be served successfully in the regular classroom. The remaining 6 students would be referred to MDE; they represent 1.20 percent of the total school population. Half of these students (3 students or 46 percent) would be determined ineligible for special education and would remain in regular education; the other half (3 students or 54 percent) would be placed in special education where they represented 0.65 percent of the total school population. Following the direct referral path, 4 students (0.88 percent of the student body) would be referred directly to MDE, where all of them would be evaluated and placed in special education. The combined result in IST schools would be 7 students placed in special education, or a placement rate of 1.52 percent.

Figure 1
Flow of Students Into Special Education in an IST School



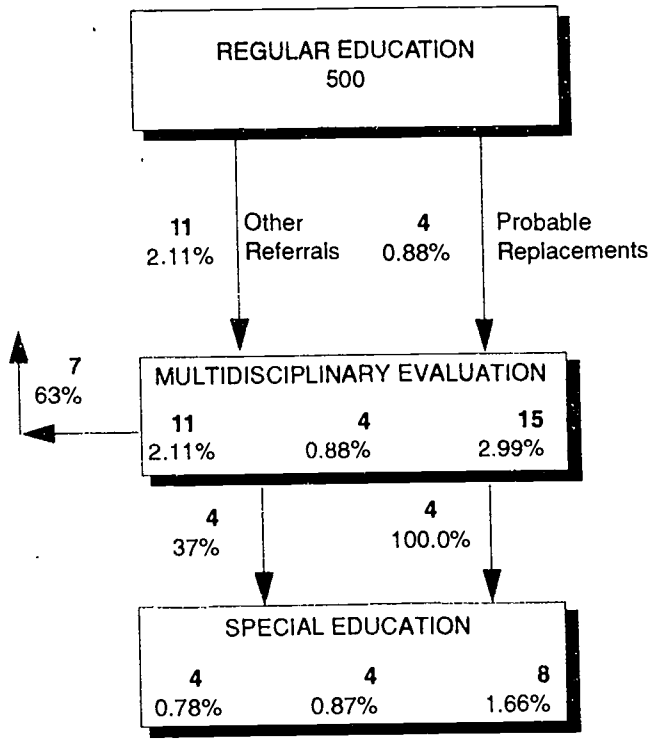
Traditional Schools

In all, 15 students (2.99 percent of the total student population) would be referred to MDE. This group is comprised of 11 students who would be similar to the IST students and 4 students who would be probable special education placements. All of the probable placements would be evaluated and placed in special education, while only 4 students of the other referrals (37 percent) who received a MDE would be placed in special education. The remaining 7 students (63 percent of the other referrals) would remain in regular education. The combined result in traditional schools would be 8 students placed in special education, or a placement rate of 1.66 percent.

In the typical schools comparison shown in Figures 1 and 2, there is a reduction in IST schools of students placed in special education from eight to seven students overall or from four to three with supposedly similar students with mild

disabilities. While this reduction amounts to only one student per school in one year, it represents a 12.5 percent reduction in total placements and a 25 percent reduction among students with milder learning problems. This effect offers significant potential to decrease long-term, multiyear costs across the state.

Figure 2
Flow of Students Into Special Education in a Traditional School



V. Program Costs

Cost Components

Costs for the IST and traditional schools were based on the components of the prereferral, evaluation, and placement processes that each group utilized. In addition, reductions in retentions were treated as savings. The unit of analysis for cost comparisons was the school. Comparisons were made between the IST and traditional schools based upon the average effectiveness results and the relevant cost factors.

■ IST costs

Costs for the IST component consisted of the salary and benefits of the support teacher assigned to the school and the value of the time spent by other personnel involved with the IST process. These were estimated at $54,308 for the support teacher plus $670 per IST student. The calculations appear in Table 3.

■ MDE costs

Costs for the MDE component were based on the value of the time school personnel spent in the multidisciplinary process. These were estimated at $804 per IST student, as shown in Table 3.

■ Special education placement costs

The additional cost of placement in special education was based on the 1993-94 regular education expenditure per student ($6,366) and an estimated average special education cost factor of two times regular education. The result was an additional placement cost of $6,366 per student.

Table 3
Costs of IST and MDE Components: 1993-94

IST Teacher Costs (Salary & Benefits)			$54,308 per School		
Other Personnel					
Position	**Salary & Benefits 1993-94**	**IST Hours per Student**	**IST Cost per Student**	**MDE Hours per Student**	**MDE Cost per Student**
Principal	$78,415	1.9	$74	1.3	$51
School Psychologist	$63,831	1.0	$43	9.1	$392
Counselor	$56,667	3.7	$142	2.3	$88
Referring Teacher	$54,308	8.4	$308	2.4	$88
Special Ed Teacher	$54,308		$0	1.3	$48
Special Ed Supervisor	$74,016		$0	1.1	$41
Reading Teacher	$54,308	1.6	$59	0.8	$29
Speech Therapist	$54,681		$0	0.8	$30
Social Worker	$60,763		$0	0.9	$37
Other	$54,308	1.2	$44	0	
Total		17.8	$67[illegible]	20.0	$804

Administrators assumed to work 250 days per year, 8 hours per day.
Teachers and other certified staff assumed to work 185 days per year, 8 hours per day.

Retention Costs

Using a hypothetical elementary school of 500 students and the average retention rates before and after IST related to year of operation (1.95 percent before and 0.96 percent after, as shown in Table 2), the IST schools (after the first year of operation) had an average of 5 fewer students retained than did the traditional schools (1 percent difference X 500 students). At a cost of retention equal to the regular education expenditure per student ($6,366), this resulted in an average cost savings in IST schools of an estimated $31,831 for the year.

Cost Comparison of IST and Traditional Schools

A comparison was made of the total 10-year costs of IST and traditional schools, which included both the first year costs of implementation and the expected long-term placement costs (under three different discount rate assumptions) for

students assigned to special education programs. The outcomes, shown in Table 4, are based on the average results and costs of each type of school. The net costs of the IST schools included four components: costs of IST, costs of MDE, first-year and long-term costs of special education placement, and cost savings from reduced retention. The relevant comparison costs of traditional schools were the costs of MDE and the first-year and long-term costs of placement in special education programs. The cost comparisons are given in both dollar amounts and as a cost ratio (traditional school costs/IST school costs). Negative dollar amounts indicate that the IST schools were calculated to cost more than the traditional schools; this was also the condition when the cost ratio was less than 1.00.

In the first year of operation, the traditional schools approach cost less than the IST approach by over $38,000; the cost ratio indicated that the traditional school costs were 62 percent of the IST school costs in the initial year. This was an expected outcome given the front-end investment for the support teacher in that program. However, these results were reversed when the long-term costs were considered. Using the 5 percent discount rate, for example, the IST schools showed slightly lower costs over a 10-year period ($7,000 less costly and a cost ratio of 1.02). Even under the higher 10 percent discount rate, the cost comparison showed total 10-year costs of IST and traditional schools to be equal. The reason for the turnaround was the higher long-term costs of more students placed in special education under the traditional program.

Table 4
Cost Comparison of IST and Traditional Schools: 1993-94

	IST Schools	Traditional Schools	Cost Difference	Cost Ratio
Total School Population (Hypothetical)	500	500		
Cost of IST Process				
IST Teacher	$54,308			
Other Staff	$26,130			
Total	$80,438		($80,438)	
Cost of MDE				
Referrals from IST	$4,824			
Direct Referrals w/o IST	$3,216			
Total	$8,040	$12,060	$4,020	
Special Education Placements				
Referrals from IST	$19,098			
Direct Referrals w/o IST	$25,465			
Total	$44,563	$50,929	$6,366	
Retention Savings	($31,831)		$31,831	
Net First-Year Costs	$101,210	$62,989	($38,221)	0.62
0% Discount Rate				
Long-Term Placement Costs	$401,067	$458,361	$57,294	
Total 10-Year Costs	$502,277	$521,350	$19,073	1.04
5% Discount Rate				
Long-Term Placement Costs	$316,746	$361,996	$45,250	
Total 10-Year Costs	$417,956	$424,985	$7,029	1.02
10% Discount Rate				
Long-Term Placement Costs	$256,640	$293,302	$36,662	
Total 10-Year Costs	$357,850	$356,291	($1,559)	1.00

VI. Sensitivity Analyses

Time in Program

An important assumption in the analysis of the IST program costs and cost comparisons with traditional schools was the assumed length of time students were in special education programs. Long-term placement costs over multiple years dominated the total costs of both types of schools. In order to test the sensitivity of the outcomes to the assumption of a 10-year placement period, the total 10-year costs and cost ratios were recalculated using other numbers of years in special education.

The results of the sensitivity of the outcomes to assumed length of time in special education appear in Table 5, which uses a 5 percent discount rate. (See the shaded column under 7 IST students.) The cost comparisons were not highly sensitive to the number of years in special education. From two to eight years of implementation, traditional schools showed slightly lower costs; after nine years the cost advantage was with IST schools. However, the differences throughout the time period were small and represented only a small fraction of the total costs involved, particularly as the number of years increased.

Differences in Numbers of Students Placed in Special Education

Another sensitivity analysis was conducted to determine the impact of improving the IST process and reducing the number of students placed in special education. The original comparison found traditional schools with eight placements and IST schools with seven placements for a difference of only one student placement. In this extended analysis, the number of students placed through IST schools was reduced, and the cost comparisons between IST and traditional schools were

recalculated. The results, also shown in Table 5, were quite sensitive to reductions in special education placements in IST schools. (See the shaded row using 10 years in special education.) As the number of students placed in special education in IST schools declined, even by one student, the total 10-year cost savings with IST was greatly increased. The reason for the sensitivity of the outcomes to this variable was that each reduced placement represented a total cost savings of 10 years of special education placement costs; discounted at 5 percent, this was approximately $51,000.

Combination of Time in Program and Fewer Students Placed through IST

A final sensitivity analysis tested the combined impact of varying both the time students were assumed to remain in special education programs and the number of students placed through IST (Table 5). The outcomes reflected the relative sensitivity of each measure. There was a stronger effect from reducing the number of students placed than from reducing the number of years in special education. For example, if IST could lower the placements to four students (a reduction of three from present practice of seven), there would be a cost savings with IST at only a two-year placement period. Even with only a reduction of one student placed (from seven to six), the IST showed cost savings in the third year.

Table 5
Sensitivity Analysis for Years in Special Education and IST Students Placed in Special Education

Total 10-Year Cost Savings with IST
Discount Rate: 5%

Years in Special Education	IST Students Placed in Special Education: 7	6	5	4	3	2
2	($32,158)	($19,728)	($7,299)	$5,130	$17,559	$29,988
3	($26,383)	($8,180)	$10,024	$28,227	$46,430	$64,634
4	($20,884)	$2,819	$26,522	$50,224	$73,927	$97,630
5	($15,647)	$13,294	$42,234	$71,174	$100,114	$129,054
6	($10,659)	$23,270	$57,198	$91,126	$125,054	$158,983
7	($5,908)	$32,771	$71,450	$110,128	$148,807	$187,486
8	($1,384)	$41,819	$85,022	$128,226	$171,429	$214,632
9	$2,925	$50,437	$97,949	$145,461	$192,973	$240,485
10	$7,029	$58,644	$110,260	$161,876	$213,491	$265,107

Total 10-Year Cost Ratio with IST

Years in Special Education	0	IST Students Placed in Special Education: 7	6	5	4	3	2
2		0.78	0.85	0.94	1.05	1.19	1.37
3		0.86	0.95	1.07	1.22	1.42	1.69
4		0.91	1.01	1.15	1.33	1.58	1.94
5		0.94	1.06	1.21	1.41	1.70	2.13
6		0.96	1.09	1.25	1.47	1.79	2.28
7		0.98	1.11	1.29	1.52	1.86	2.40
8		1.00	1.13	1.31	1.56	1.92	2.50
9		1.01	1.15	1.33	1.59	1.97	2.59
10		1.02	1.16	1.35	1.62	2.01	2.66

Sensitivity Analysis for Years in Special Education

Sensitivity Analysis for Number of IST Students Places in Special Education

Breakeven between IST and Traditional Schools
Above line Traditional schools cost less
Below line IST schools cost less

VII. Cost-Effectiveness

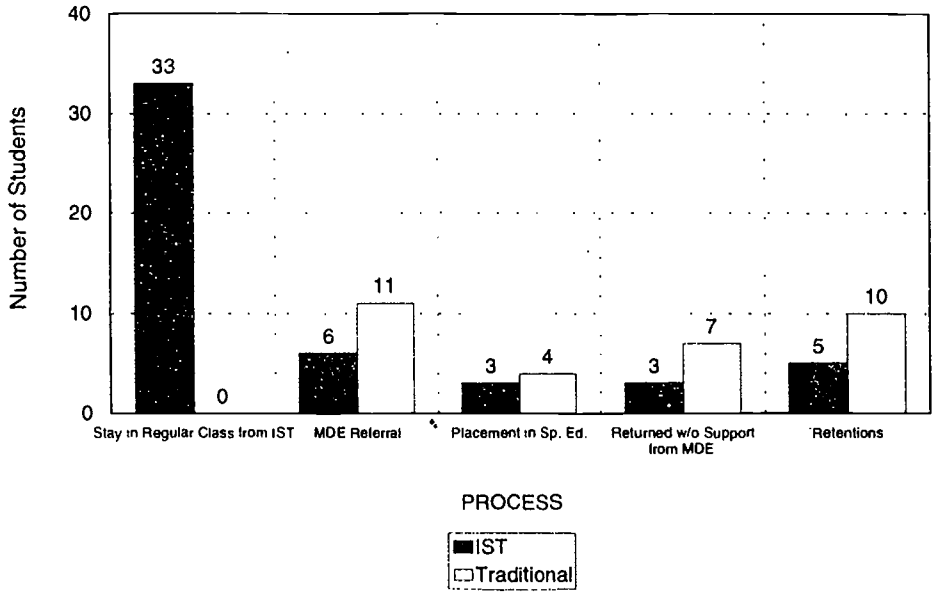
A program is more cost-effective than another if it can produce the same outputs at a lower cost or if it can produce greater outputs at the same cost. These standards are really two sides of the same coin. How did the IST perform under these criteria?

With the average operating results (seven IST students placed in special education), the IST program did not show a cost savings (at a 5 percent discount rate) until the ninth year; but the cost differences were not substantial, even if average length of placements was six years or less. While differences did exist, the IST had approximately equal costs to the traditional program if students placed in special education remained there for five or more years. So while there were no great cost savings found with IST, there were not substantially greater costs either. The cost comparison approaches an equivalency.

The strength of the IST lies in providing more and better services to more students. Many more students with learning and behavioral problems were provided services through the IST program than the traditional program. The results are summarized in Figure 3. In the hypothetical school analysis, 33 of the 39 students initially referred to IST (out of a total school population of 500) remained in regular education after participating in the IST process and were able to function adequately in the regular classroom. Because of the stringent monitoring of student progress in the IST process, it was assumed that the instructional services these students received were effective, maintained them in the regular classroom, and kept them out of special education. These were students who were identified as having learning difficulties, but were appropriately served through regular education following IST assistance. Fewer students in IST schools were referred to MDE for evaluation; fewer were placed in special education; fewer were returned to regular education (without additional support in the regular classroom) following a MDE; and fewer were retained in the same grade.

Therefore, on all measures, the IST appeared to be more effective in serving students.

Figure 3
Comparisons of Student Impact: IST Schools vs. Traditional Schools



In summary, the effectiveness of the IST program was much greater than the traditional program; it was able to reduce the number of students placed in special education, while at the same time providing extensive and successful instructional services to many more children in regular education. It did this at a cost that was no greater than the traditional program over a 5 to 10-year period. Consequently, with the costs approximately equal to the traditional program and with greater effectiveness for students, the conclusion is that the IST program is cost-effective.

The greatest opportunity for improving the cost-effectiveness of the IST lies in reducing the number of students placed in special education. There are at least two options for achieving this goal: (1) reduce the numbers of students who bypass the IST process and go straight to the MDE, and route them through IST for initial assistance; and (2) further improve the IST process so that even more students are able to receive appropriate instructional services in the regular classroom. Both are feasible given the increasing experience of schools with IST and the greater responsibility of regular classroom teachers for instructing all students.

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